

DEFENDANTS' MOTION FOR SUMMARY JUDGMENT—EXHIBIT 2
RICHARD CLARKE EXPERT REPORT (JAN. 24, 2018)

EXCERPTED—THIS CONTAINS ONLY THE SUBSTANCE OF HIS REPORT. IT DOES
NOT CONTAIN HIS CV, HIS LIST OF PUBLICATIONS, OR ALL OF THE EXHIBITS
THAT WERE PROVIDED WITH THE REPORT



Clarence Edward Whitaker. etc., v. Hyundai Motor America, Inc.

James Lowe
Lowe, Eklund, Wakefield
610 Skylight Office Tower
1660 West Second Street
Cleveland, OH 44113-1454

Re: **Clarence Edward Whitaker. etc., v. Hyundai Motor America, Inc.**
2007 Hyundai Santa Fe
VIN: 5NMSH13E57H041555
Case # R-1128

Report of Investigation and Analysis

January 25, 2018

I am an Automotive Consultant and a Failure Analysis Expert employed by Clarke Automotive Consultants (CAC) of Braselton, Georgia. The process and procedures utilized in this investigation have been accepted and presented in U.S. Federal, U.S. State Courts.

A. Assignment

On August 17, 2016, Mr. James A. Lowe, in association with Lowe, Eklund, Wakefield engaged Clarke Automotive Consultants to conduct an investigation into unintended vehicle movement involving a 2007 Hyundai Santa Fe the subject vehicle (SV).

The specific purpose of this investigation was to evaluate the gear shift mechanism and related components of the Subject Hyundai Santa Fe.

B. Scope

In reference to the assigned task, the following work has been performed to date:

1. Preliminary inspection of the SV and accident scene on 08/23/16, in Pulaski, Virginia.
2. Obtain exemplar gear shift lever and steering column assembly on 09/22/16.
3. Second inspection and transportation of SV back to GA on 10/06/16.
4. Third inspection of SV on 07/27/17 at Buckingham Automotive.
5. Review of exemplar gear shift lever and steering column assembly on 08/08/17.

6. Obtain exemplar steering column and gear shift assembly on 10/03/17.
7. Inspection of exemplar steering column assemblies on 10/04/17.
8. Review of SV with Bill Carden From MEI. on 10/25/17.
9. Forth inspection of SV at Buckingham Automotive on 10/26/17.
10. Review of a exemplar 2007 Hyundai Santa Fe on 11/08/17.
11. Lab inspection of SV, steering column and ignition lock on 01/10-11/18 at MEI.
12. Study and review of the County of Pulaski Regional Emergency Medical Services Report.
13. Study and review of the Commonwealth of Virginia Chief Medical Examiners Report.
14. Study and review of the Pulaski Police Department Call for Service Record and Incident Report.
15. Study and review of FMVSS 102 / 114; 1998 and 2008 versions.
16. Review the NHTSA defects and recall and complaints for the 2007 Hyundai Santa Fe.
17. Study and review of the owners and service manuals for the 2007 Hyundai Santa Fe.
18. Review of various case documents, repair orders, and car fax report supplied during discovery revealed the following.

2007 Feb 19 SV shipped to First Team, Inc. in VA from Hyundai Motor America.

2007 Jun 09 SV sold to first owner.

2007 Aug 13 SV console repaired by First Team, Inc.

2007 Oct 08 Hyundai Motor America issued service bulletin NHTSA #08E055000 for trailer hitch wiring. Moisture can corrode components on circuit board on top surface of the rear bumper reinforcement, causing short circuit.

2009 Feb 25 SV maintenance inspection, including armrest and seat belt buckle replacement, completed by First Team, Inc.

2012 Jul 31 SV maintenance inspection completed and airbag clockspring/reel replaced by First Team, Inc.

2014 Jun 30 SV sold to second owner.

2014 Jul 01 Maintenance inspection completed, oil/filter change, front and rear brake rotors resurfaced by Haley Toyota of Roanoke, VA, at 59,910 miles.

2015 Mar 04 SV offered for sale at 66,762 miles by Duncan Hyundai in Christiansburg, VA.

2015 Mar 24 SV purchased by third owner (Whitaker).

2015 Aug 24 Accident reported – right side impact with another vehicle, airbags did not deploy.

2015 Aug 27 Hyundai Motor America issued service bulletin, recall #936 for valve cover oil leak repair.

19. Preparation of this report.

C. Findings

Based on the investigation and information collected to date, my findings are as follows:

1. The primary (Key 1) and secondary Ignition Key (Key 2) can be removed from the ignition lock when the gear shift lever is in the reverse, neutral, drive and low positions.
2. The SV's gear shift lever can be shifted out of park, without depressing the foot brake and when the Ignition Key is out of the Ignition Lock Cylinder.
3. This condition overrides the Brake Shift Interlock System, and allows unintended vehicle movement.
4. The cause of this accident is a direct result of the Ignition Key being able to be removed, without the Gear Shift Lever being in the Park (P) Position.

D. Accident Summary Investigative Report

1. On October 16, 2015, Mrs. Shannon Whitaker was operating a 2007 Hyundai Santa Fe, VIN # 5NMSH13E57H041555 (SV). She had just finished work and drove home to prepare dinner for her family.
2. On Friday October 16, 2015, Mr. Whitaker called his wife at approximately 4:45 to ask her if she wanted him to pick up dinner for the family. She told him she was preparing to leave work and would make dinner at the house. 1
3. At approximately 5:15 Mr. Whitaker received a call from his 13 year old son Ryan, who was hysterical; he told his father that he and Jason, age 16, were in the house when they heard a large crash outside. They looked out the living room window and saw their mother's car against the house. 1

4. When Ryan and Jason ran outside they found their mother's car up against the side of the house and their mother hanging out of the driver's side door and her upper part of her body was inside the car crushed between the driver's side door and the frame of her car. They immediately called 911, then called their father. ¹
5. The Pulaski Police Department Call for Service Record and Incident Report stated that on Friday October 16, 2015 at approximately 17:11 hours they were dispatched to 512 Floyd Avenue, Pulaski, Virginia, 24301 in reference to a female trapped under a vehicle. ²
6. It was determined that Mrs. Shannon Whitaker had pulled into her drive way and attempted to exit her vehicle. Mrs. Whitaker had shut down the vehicle while still in a forward moving gear; the key was removed from the ignition switch and found on the driver's side front floor. The vehicle's transmission was in drive and the emergency brake was not engaged. ²

E. Subject Vehicle (SV) Inspection

1. The preliminary inspection of the SV was performed on August 17, 2016 at a storage building in Venton Virginia, as shown in photograph 1. The Vehicle Identification Number, VIN # 5NMSH13E57H041555, as shown in photograph 2. The SV driver's door and fender revealed minor damage, photographs 3 & 4. The passenger side front door glass had been broken out, as shown in photograph 5.
2. The SV had two sets of keys the primary set, Key 1 was identified as the ones with the white key fob, as shown in photograph 6. The spare, set Key 2 was in a plastic bag and identified as the one with a blue key fob, as shown in photograph 7. The SV was also equipped with an aftermarket radio and with a hands free option for a mobile phone. The microphone was mounted to the driver side A- pillar and the wire was routed under the steering column and under the instrument panel into the radio as shown in photograph 8. The odometer revealed 75,467 miles at the time of this inspection, shown in photograph 9. Two ignition keys were presented with the SV, Key 1 (White Fob) and Key 2 (Blue Fob). Each key could be removed from the ignition lock in any gear shifter position other than Park (P).
3. The ability to turn the SV off with the gear shift lever in any position other than Park (P) defeats the ignition interlock solenoid and brake shift interlock mechanism that prevented the gear shift lever from being moved out of Park (P).

¹ Witness Statement

² Police Report

4. The inspection of the 2007 Hyundai Santa Fe, VIN # 5NMSH13E57H041555 (SV), at Buckingham Automotive on October 26, 2017, revealed that the electrical connector for the ignition interlock solenoid was not connected, as shown in photograph 10.

F. Exemplar Vehicle Analysis

1. The inspection of the exemplar 2007 Hyundai Santa Fe VIN 5NMSH113EX7H053264 on November 8, 2017 was at Clarke Automotive Consultants Inc, as shown in photographs 11. The odometer revealed 118,522 miles at the time of the inspection, photograph 12. The knee bolster was removed to gain access to the ignition interlock solenoid and connector, as shown in photographs 13 & 14. The ignition key could only be removed when the gear shift lever was in Park (P), when the ignition interlock solenoid was disconnected the exemplar functioned the same as the SV.

F. M.E.I. Analysis

2. Further analysis, disassembly and removal of the ignition interlock solenoid connector was performed at M.E.I. on January 10 & 11, 2018 the female and the male portion were removed, as shown in photograph 15. A new battery was installed in the SV, photographs 16 & 17.
3. Jumper wires were connected on the sectioned SV wire harness to bypass the connector that was removed so the system could be tested, photographs 18 & 19. The jumper wires were connected and the ignition switch and the ignition interlock solenoid functioned as intended. The ignition key could only be removed when the gear shift lever was in Park (P) position.
4. Force measurements were conducted on the gear shift lever with the ignition interlock solenoid jumper wires in place and disconnected as per the test protocol. The forces were as low as 12.79 lbs and were recorded to pull the gear shift lever into Reverse (R), as shown in photograph 20. The gear shift lever assembly was removed and a small fragment of what appears to be the same material was found under the gear shift lever assembly, shown in photographs 21 & 22.

H. Laboratory Analysis

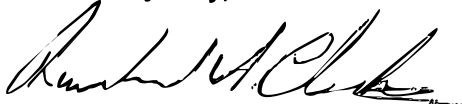
1. The 2007 Hyundai Santa Fe, VIN 5NMSH13E57H041555 (SV), Ignition interlock solenoid connectors that was removed and revealed that the connector consisted of a plastic male and female housing. The housings contained male and female type metal terminals that are used to make the electrical connection, as shown in photograph 23 & 24.
2. During the examination of the subject male and female terminals some gauges from a prior electrical examination were observed. The male portion of the electrical connector revealed contact marks, this is consistent with engagement with the female portion.

I. Opinions

1. The condition of the ignition interlock solenoid connector is defective and unreasonably dangerous.
2. The SV violates Hyundai Motors design intent in that the ignition key shall not be able to be removed from the ignition cylinder when the gear shift lever is in any position other than Park (P). Removal of the ignition key from any other gear position, other than Park (P), this will disable the Brake Shift Interlock and inadvertent or unintended vehicle roll away may occur.
3. The SV electrical connector for the ignition interlock solenoid was not fully engaged and locked at the time the vehicle was manufactured.
4. The SV electrical connector for the ignition interlock solenoid was partially engaged. This condition would not allow normal operation of the ignition interlock solenoid, ignition switch and transmission shift lever.
5. Prior to the October 16, 2015 accident that resulted in the death of Mrs. Shannon Whitaker, the SV electrical connector for the ignition interlock solenoid became disengaged. This allowed the ignition lock solenoid to malfunction which allowed the ignition key to be removed from the ignition while the gear shift lever was in a position other than Park (P).
6. The SV transmission gear shift lever is defective because it can be removed from the Park (P) position to any gear position with the key out of the ignition and without depressing the brake pedal.
7. The SV violates Federal Motor Vehicle Safety Standards (FMVSS) 102,114.
8. Each of the defects and failures identified above is a direct and proximate cause of the accident that occurred on October 16, 2015, allowing Mrs. Shannon Whitaker to remove the ignition key while the SV was in another gear other than Park (P). This is a direct and proximate cause of the accident where Mrs. Shannon Whitaker sustained her fatal injuries.

The conclusion in this report have been reached to a reasonable degree of engineering certainty, and is based on information collected to date, and my opinions, education and training. The data, findings, and opinions are subject to change which may be warranted by subsequently acquired information. This report, or portions thereof, may not be used for advertising or otherwise published without first obtaining written consent.

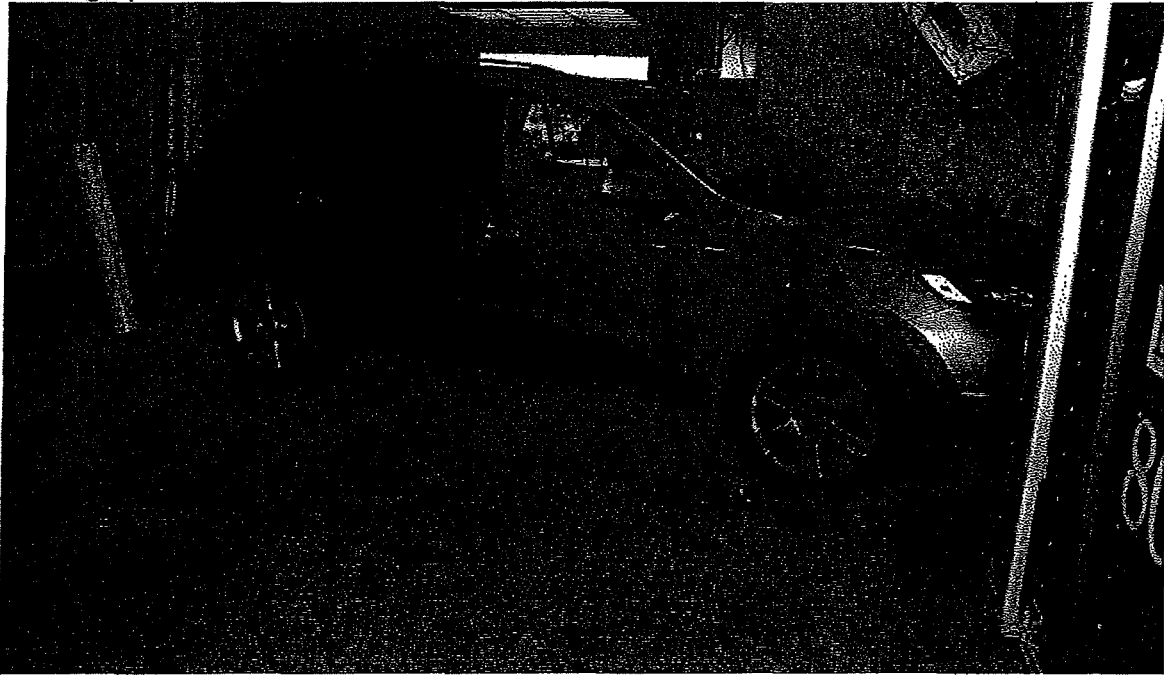
Yours very truly,



Richard A. Clarke

Photo Log		
Photograph #:		Date:
1	DSC0002	8/23/2016
2	CAC10021	8/23/2016
3	CAC10005	8/23/2016
4	CAC10006	8/23/2016
5	CAC10013	8/23/2016
6	CAC10020	8/23/2016
7	CAC10019	8/23/2016
8	DP-0073	10/26/2017
9	CAC10113	8/23/2016
10	DSC10021	10/26/2017
11	CAC10014	11/8/2017
12	CAC10013	11/8/2017
13	CAC10020	11/8/2017
14	CAC10022	11/8/2017
15	CAC10012	1/10/2018
16	CAC10045	1/10/2018
17	CAC10042	1/10/2018
18	CAC10048	1/10/2018
19	CAC10049	1/10/2018
20	CAC10074	1/10/2018
21	CAC10022	1/11/2018
22	CAC10025	1/11/2018
23	CAC10104	1/10/2018
24	CAC10106	1/10/2018

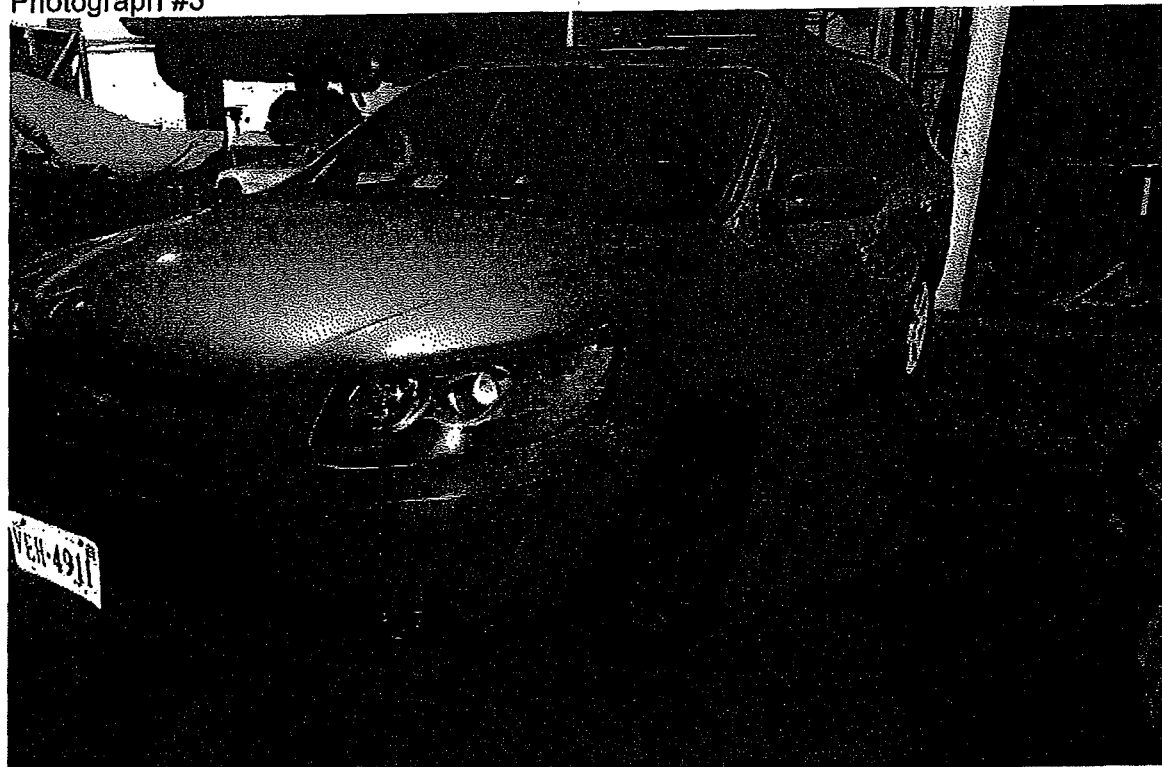
Photograph #1



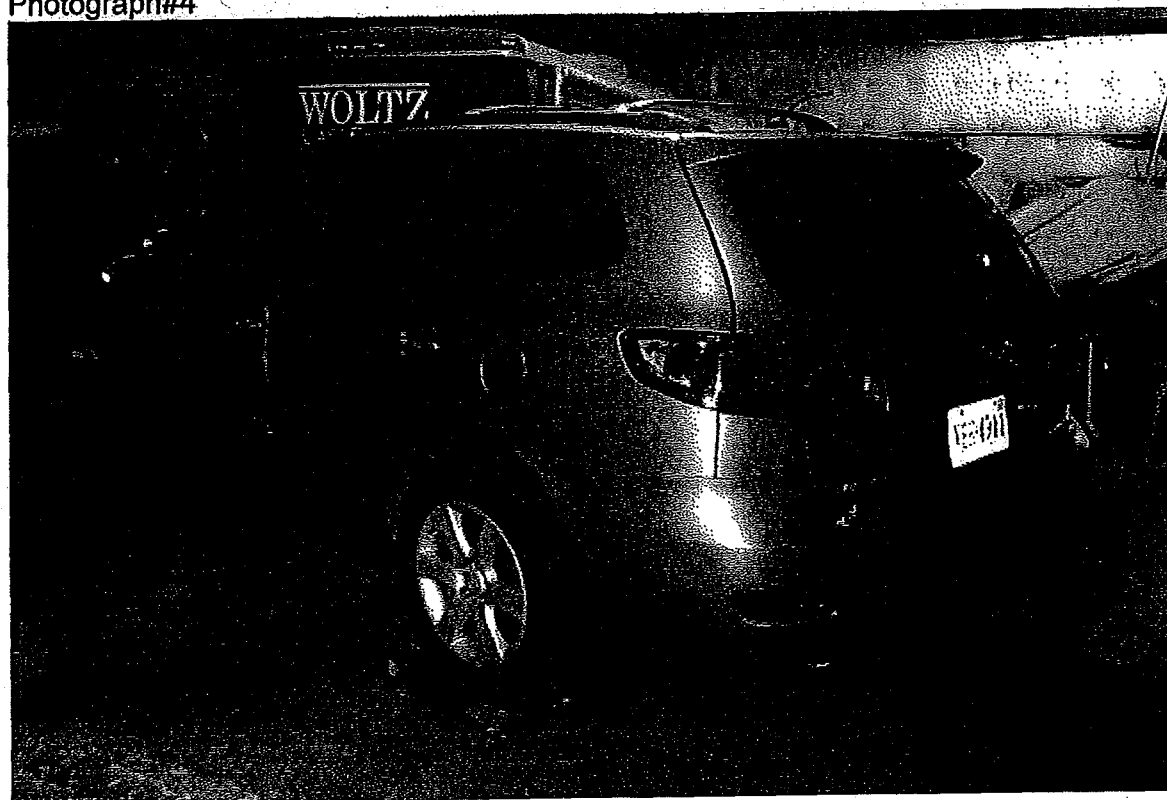
Photograph #2



Photograph #3



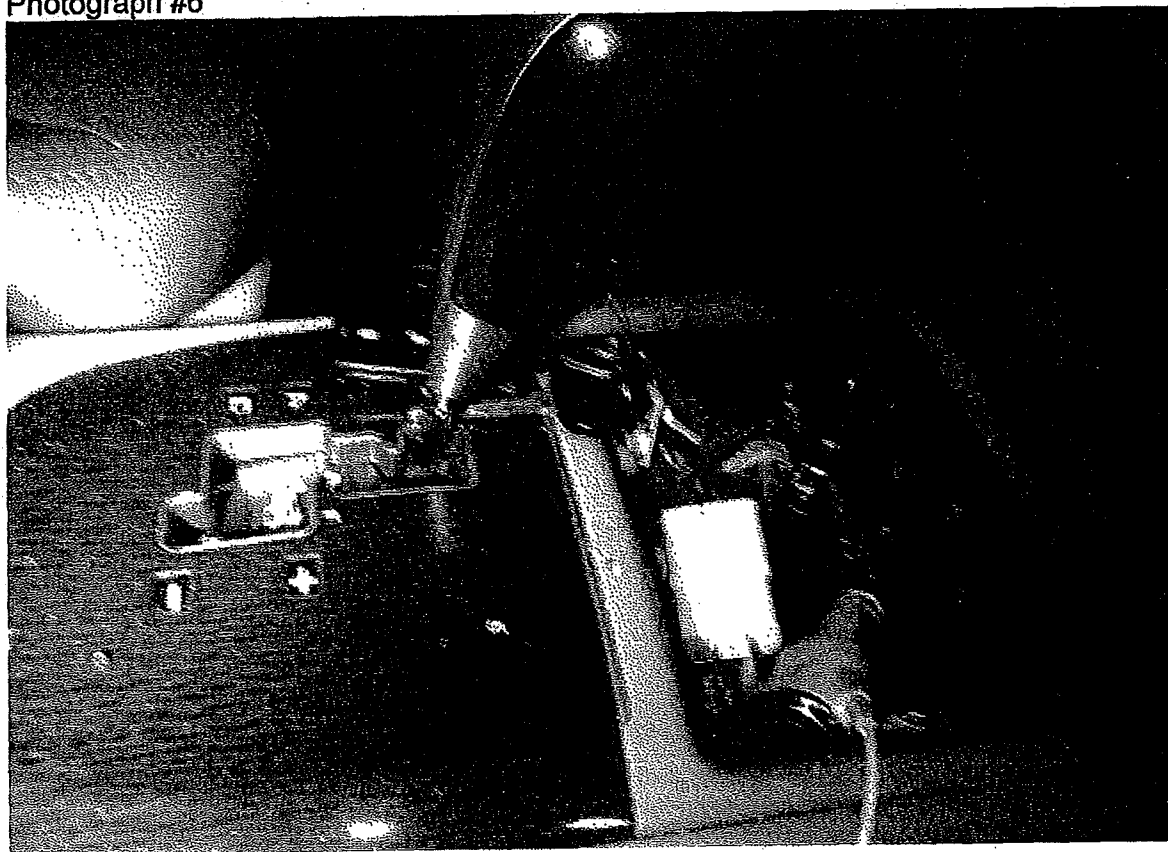
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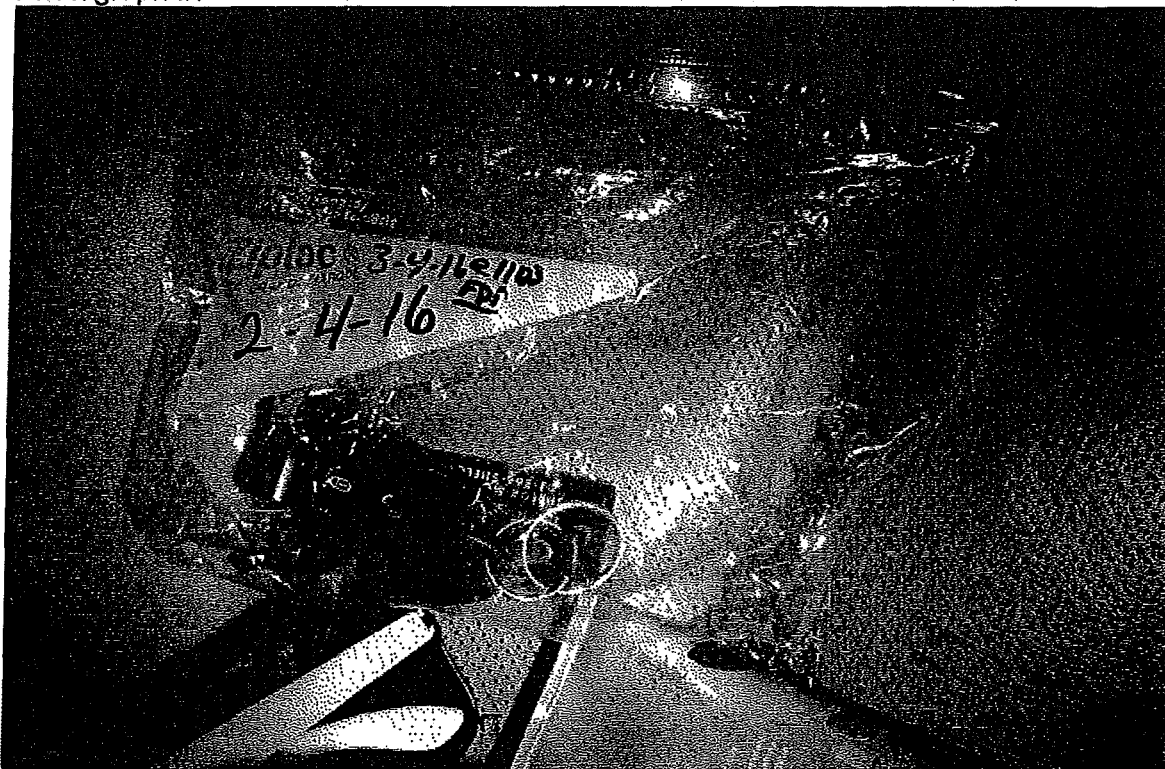
Photograph #5



Photograph #6



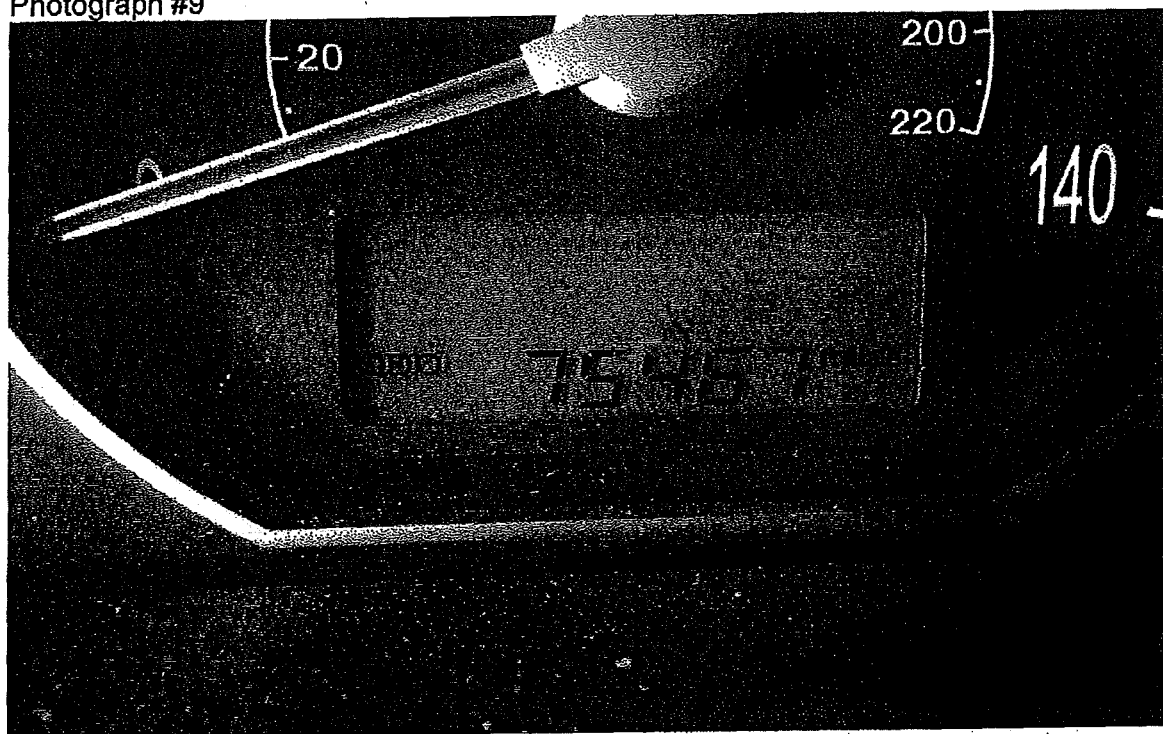
Photograph #7



Photograph #8



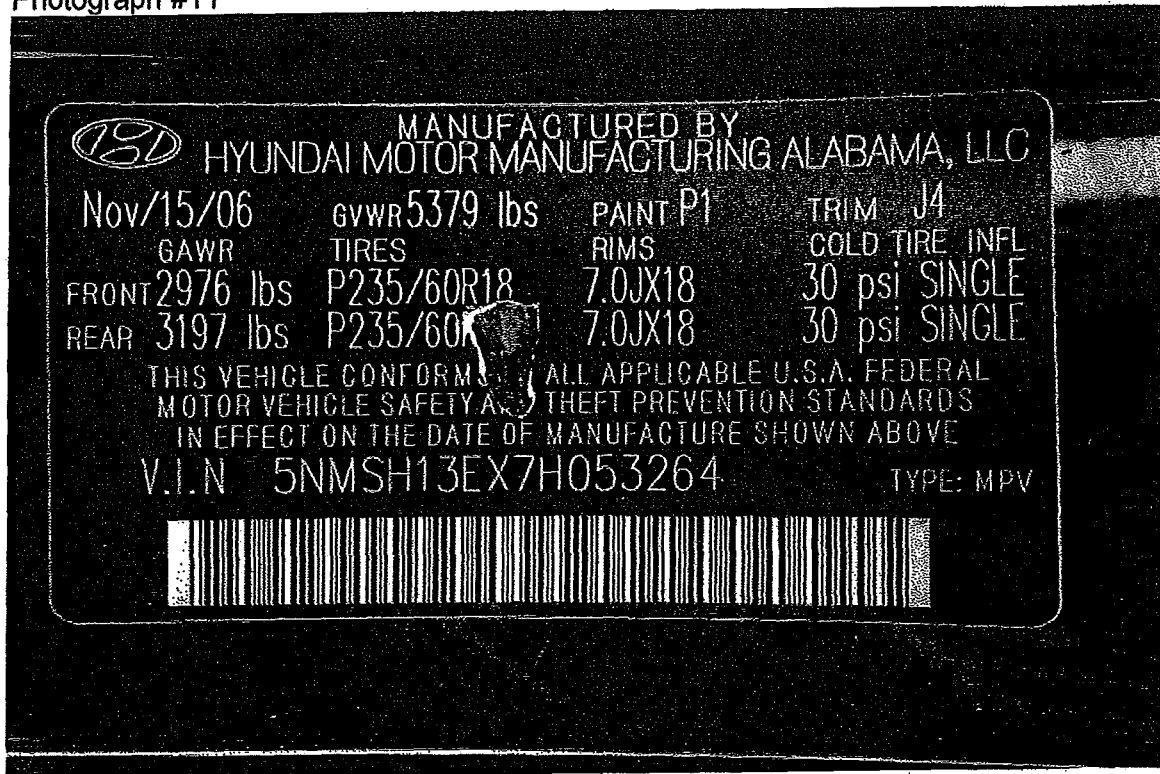
Photograph #9



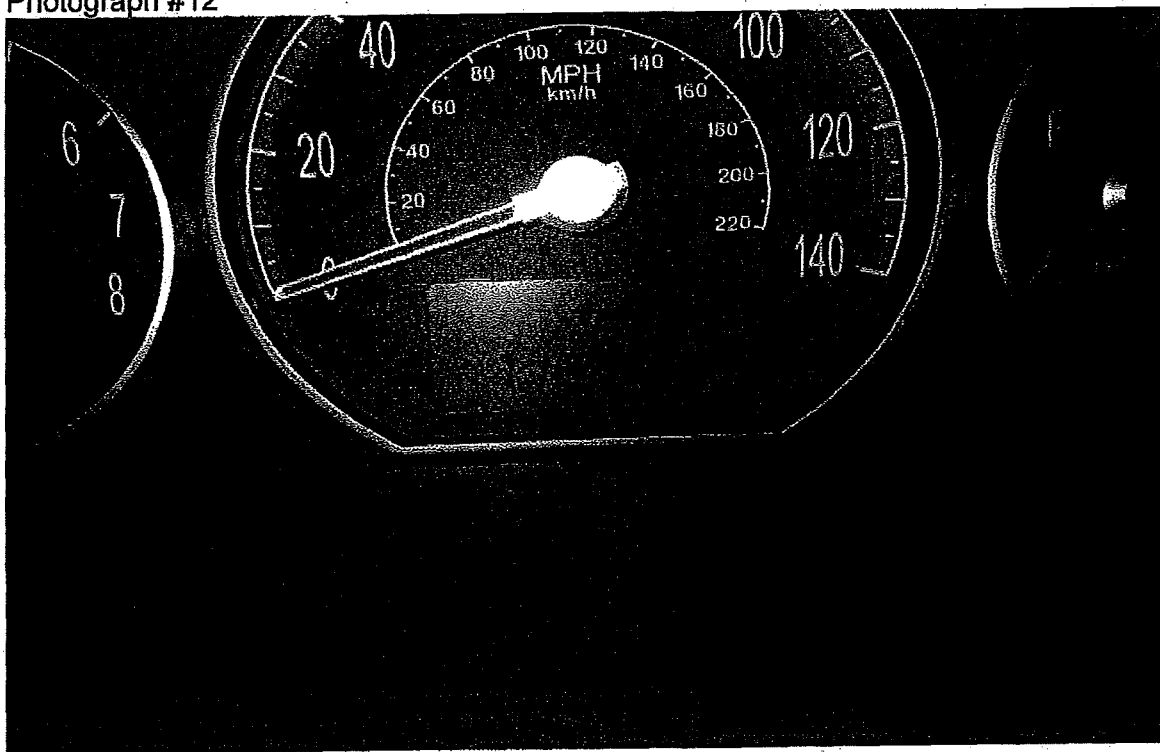
Photograph#10



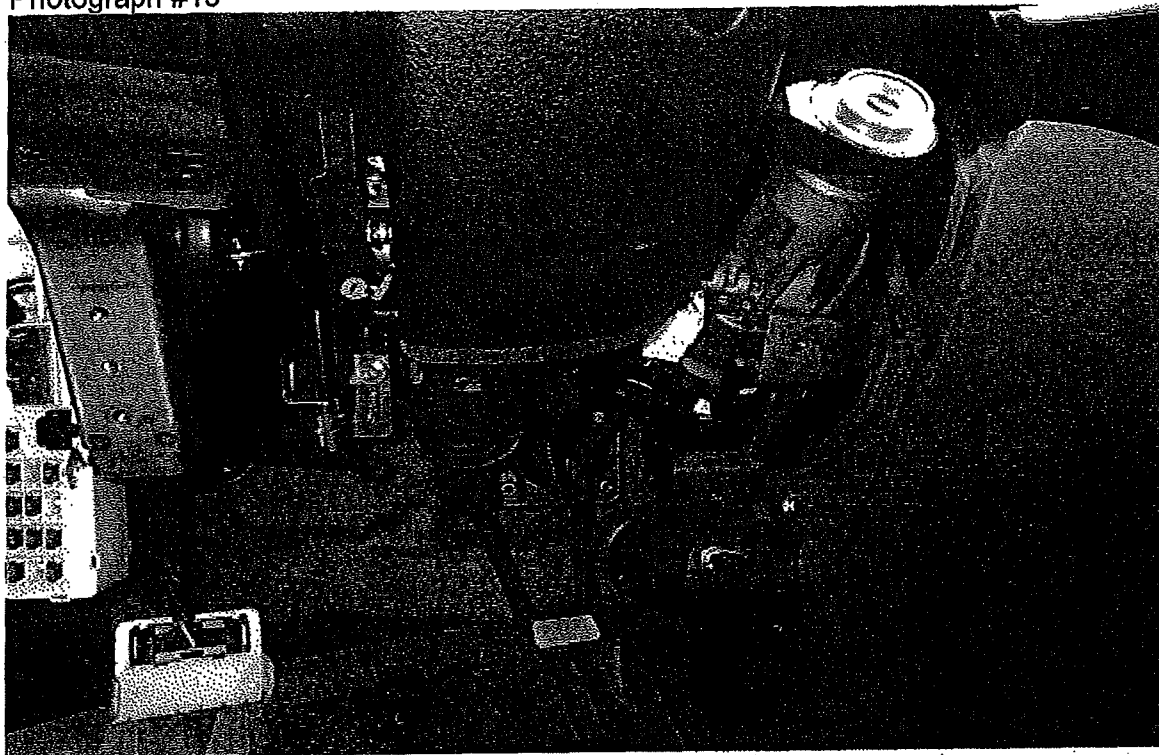
Photograph #11



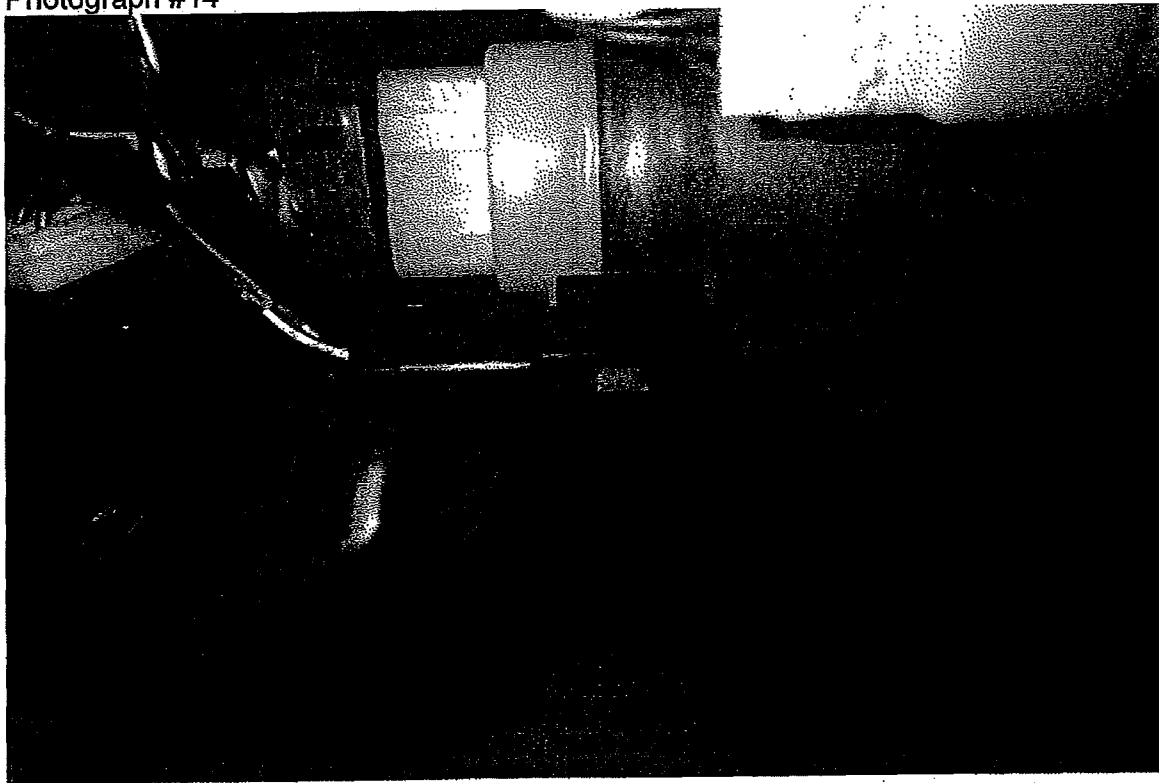
Photograph #12



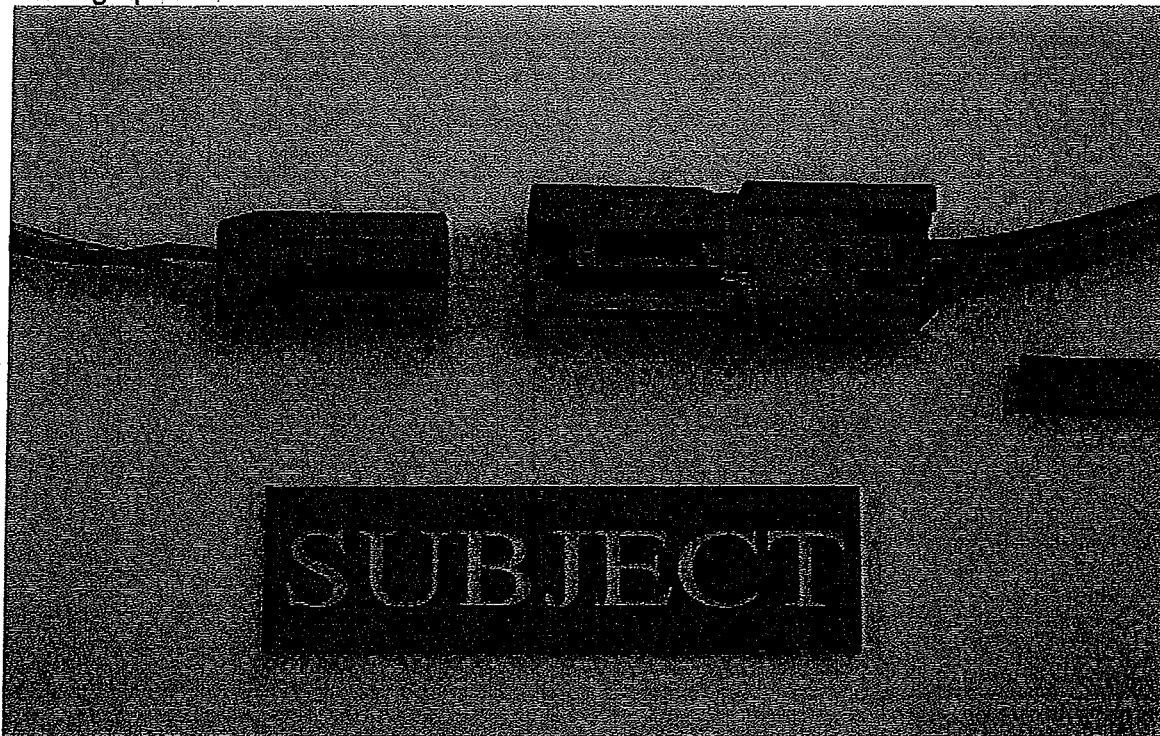
Photograph #13



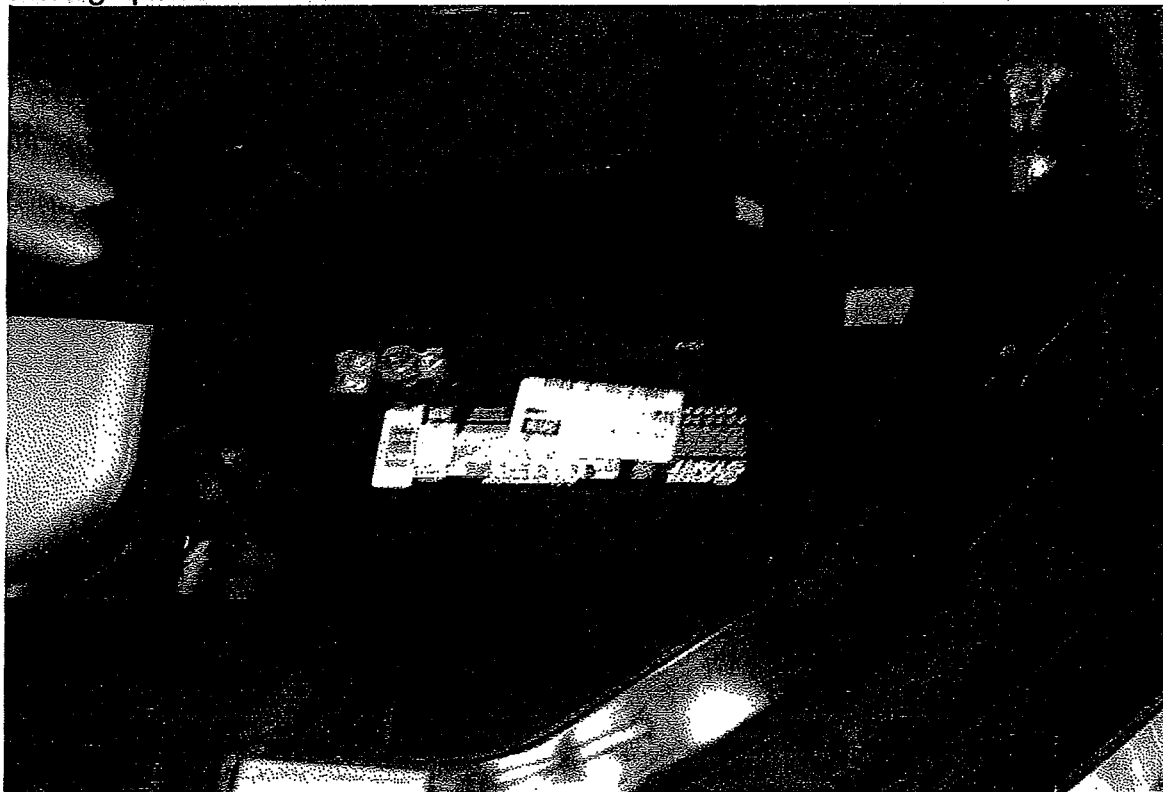
Photograph #14



Photograph #15



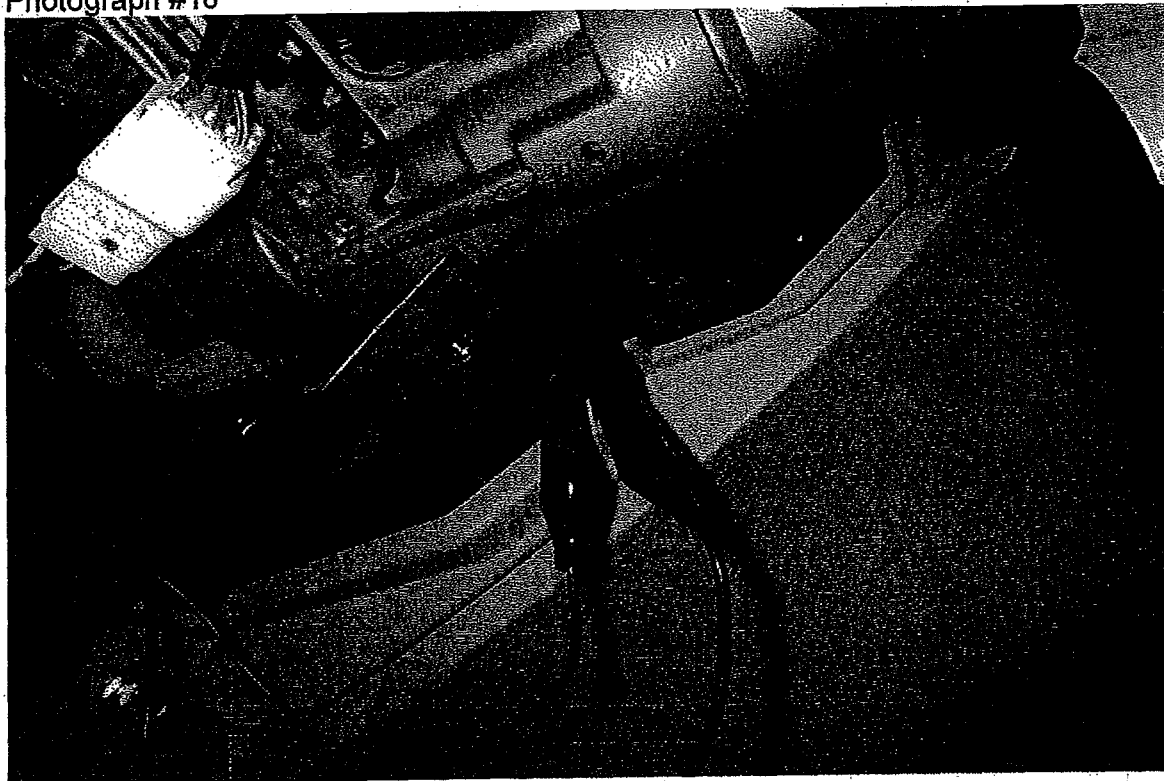
Photograph #16



Photograph #17



Photograph #18



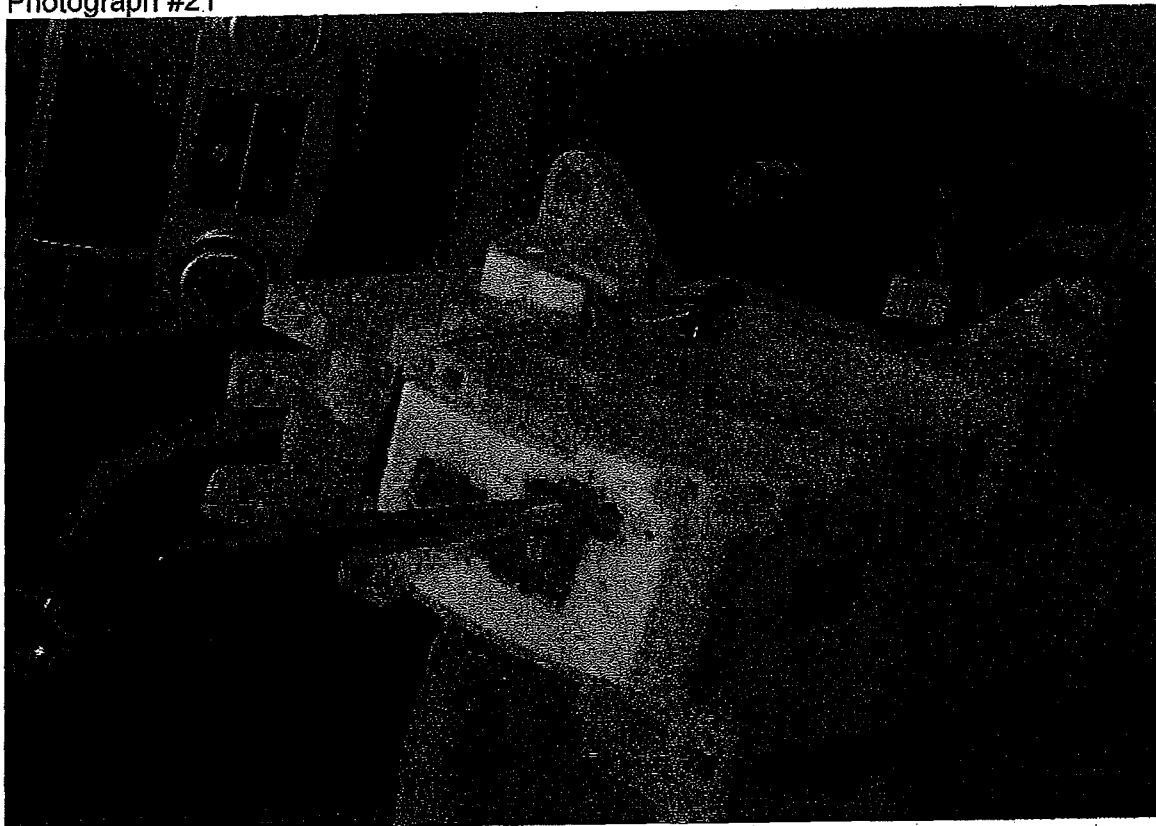
Photograph #19



Photograph #20



Photograph #21



Photograph #22



Photograph #23



Photograph #24

